

CPC**COOPERATIVE PATENT CLASSIFICATION****C10J**

PRODUCTION OF PRODUCER GAS, WATER-GAS, SYNTHESIS GAS FROM SOLID CARBONACEOUS MATERIAL, OR MIXTURES CONTAINING THESE GASES ([synthesis gas from liquid or gaseous hydrocarbons C01B](#); [underground gasification of minerals E21B 43/295](#)); **CARBURETTING AIR OR OTHER GASES**

C10J 1/00

Production of fuel gases by carburetting air or other gases without pyrolysis ([for internal-combustion engines F02](#))

C10J 1/02

- . Carburetting air

C10J 1/04

- .. Controlling supply of air

C10J 1/06

- .. with materials which are liquid at ordinary temperatures

C10J 1/08

- ... by passage of air through or over the surface of the liquid

C10J 1/10

- with the liquid absorbed on carriers

C10J 1/12

- ... by atomisation of the liquid

C10J 1/14

- ... Controlling the supply of liquid in accordance with the air supply

C10J 1/16

- .. with solid hydrocarbons

C10J 1/18

- .. in rotary carburettors

C10J 1/20

- . Carburetting gases other than air

C10J 1/207

- . Carburetting by pyrolysis of solid carbonaceous material in a fuel bed ([C10J 3/66 takes precedence](#))

C10J 1/213

- . Carburetting by pyrolysis of solid carbonaceous material in a carburettor

C10J 1/22

- . Adding materials to prevent vapour deposition

C10J 1/24

- . Controlling humidity of the air or gas to be carburetted

C10J 1/26

- . using raised temperatures or pressures

C10J 1/28

- . Odourising air gas

C10J 3/00

Production of combustible gases containing carbon monoxide from solid carbonaceous fuels ([destructive distillation processes C10B](#))

C10J 3/002

- . { Horizontal gasifiers, e.g. belt-type gasifiers }

C10J 3/005

- . { Rotary drum or kiln gasifiers }

C10J 3/007

- . { Screw type gasifiers }

- C10J 3/02 . Fixed-bed gasification of lump fuel
- C10J 3/04 .. Cyclic processes, e.g. alternate blast and run
- C10J 3/06 .. Continuous processes
- C10J 3/08 ... with ash-removal in liquid state
- C10J 3/10 ... using external heating
- C10J 3/12 ... using solid heat-carriers
- C10J 3/14 ... using gaseous heat-carriers
- C10J 3/16 ... simultaneously reacting oxygen and water with the carbonaceous material
- C10J 3/18 ... using electricity
- C10J 3/20 .. Apparatus; Plant
- C10J 3/22 ... Arrangement or dispositions of valves or flues
- C10J 3/24 to permit flow of gases or vapours other than upwardly through the fuel bed
- C10J 3/26 downwardly
- C10J 3/28 fully automatic
- C10J 3/30 ... Fuel charging devices
- C10J 3/32 ... Devices for distributing fuel evenly over the bed or for stirring up the fuel bed
- C10J 3/34 ... Grates; Mechanical ash-removing devices
- C10J 3/36 Fixed grates
- C10J 3/38 with stirring beams
- C10J 3/40 Movable grates
- C10J 3/42 Rotary grates
- C10J 3/44 ... adapted for use on vehicles

- C10J 3/46 . Gasification of granular or pulverulent flues in suspension

WARNING

[C10J 3/463](#), [C10J 3/466](#), [C10J 3/482](#), [C10J 3/485](#), [C10J 3/503](#), [C10J 3/506](#), [C10J 3/523](#) and [C10J 3/526](#) are not complete pending a reorganisation. See also [C10J 3/46](#)

- C10J 3/463 .. { in stationary fluidised beds}
- C10J 3/466 .. { Entrained flow processes}
- C10J 3/48 .. Apparatus; Plant
- C10J 3/482 ... { Gasifiers with stationary fluidised bed}
- C10J 3/485 ... { Entrained flow gasifiers}
- C10J 3/487 { Swirling or cyclonic gasifiers}
- C10J 3/50 ... Fuel charging devices
- C10J 3/503 { for gasifiers with stationary fluidised bed}
- C10J 3/506 { for entrained flow gasifiers}
- C10J 3/52 ... Ash-removing devices
- C10J 3/523 { for gasifiers with stationary fluidised bed}
- C10J 3/526 { for entrained flow gasifiers}
- C10J 3/54 .. Gasification of granular or pulverulent fuels by the Winkler technique, i.e. by

- fluidisation
- C10J 3/56 . . . Apparatus; Plant
- C10J 3/57 . Gasification using molten salts or metals ([C10J 3/02](#), [C10J 3/46](#) take precedence)
- C10J 3/58 . combined with pre-distillation of the fuel
- C10J 3/60 . . Processes
- C10J 3/62 . . . with separate withdrawal of the distillation products
- C10J 3/64 . . . with decomposition of the distillation products
- C10J 3/66 by introducing them into the gasification zone
- C10J 3/72 . Other features
- C10J 3/721 . . { Multistage gasification, e.g. plural parallel or serial gasification stages}
- C10J 3/723 . . { Controlling or regulating the gasification process}
- C10J 3/725 . . [N. Redox processes]
- C10J 3/726 . . { Start-up}
- C10J 3/728 . . { Shut down}
- C10J 3/74 . . Construction of shells or jackets
- C10J 3/76 . . . Water jackets; Steam boiler-jackets
- C10J 3/78 . . High-pressure apparatus
- C10J 3/80 . . with arrangements for preheating the blast or the water vapour
- C10J 3/82 . . Gas withdrawal means
- C10J 3/84 . . . with means for removing dust or tar from the gas
- C10J 3/845 { Quench rings}
- C10J 3/86 . . combined with waste-heat boilers

- C10J 2200/00 Details of gasification apparatus**
- C10J 2200/06 . Catalysts as integral part of gasifiers ([catalysts added to the feed C10J 2300/0986](#))
- C10J 2200/09 . Mechanical details of gasifiers not otherwise provided for, e.g. sealing means
- C10J 2200/12 . Electrodes present in the gasifier
- C10J 2200/15 . Details of feeding means
- C10J 2200/152 . . Nozzles or lances for introducing gas, liquids or suspensions
- C10J 2200/154 . . Pushing devices, e.g. pistons
- C10J 2200/156 . . Sluices, e.g. mechanical sluices for preventing escape of gas through the feed inlet
- C10J 2200/158 . . Screws
- C10J 2200/31 . Mobile gasifiers, e.g. for use in cars, ships or containers
- C10J 2200/33 . Laboratory scale gasifiers

C10J 2200/36 . Moving parts inside the gasification reactor not otherwise provided for ([devices for distributing fuel evenly over a fixed bed C10J 3/32](#))

C10J 2200/39 . Gasifiers designed as centrifuge

C10J 2300/00 Details of gasification processes

C10J 2300/06 . Modeling or simulation of processes

C10J 2300/09 . Details of the feed, e.g. feeding of spent catalyst, inert gas or halogens

C10J 2300/0903 .. Feed preparation

C10J 2300/0906 ... Physical processes, e.g. shredding, comminuting, chopping, sorting

C10J 2300/0909 ... Drying

C10J 2300/0913 .. Carbonaceous raw material

C10J 2300/0916 ... Biomass

C10J 2300/092 Wood, cellulose

C10J 2300/0923 Sludge, e.g. from water treatment plant

C10J 2300/0926 ... Slurries comprising bio-oil or bio-coke, i.e. charcoal, obtained e.g. by fast pyrolysis of biomass

C10J 2300/093 ... Coal

C10J 2300/0933 Coal fines for producing water gas

C10J 2300/0936 Coal fines for producing producer gas

C10J 2300/094 ... Char

C10J 2300/0943 ... Coke

C10J 2300/0946 ... Waste, e.g. MSW, tires, glass, tar sand, peat, paper, lignite, oil shale

C10J 2300/095 ... Exhaust gas from an external process for purification

C10J 2300/0953 .. Gasifying agents

C10J 2300/0956 ... Air or oxygen enriched air

C10J 2300/0959 ... Oxygen

C10J 2300/0963 ... Ozone

C10J 2300/0966 ... Hydrogen

C10J 2300/0969 ... Carbon dioxide

C10J 2300/0973 ... Water

C10J 2300/0976 as steam

C10J 2300/0979 as supercritical steam

C10J 2300/0983 .. Additives

C10J 2300/0986 ... Catalysts

C10J 2300/0989 ... Hydrocarbons as additives to gasifying agents to improve caloric properties

C10J 2300/0993 ... Inert particles, e.g. as heat exchange medium in a fluidized or moving bed, heat carriers, sand

C10J 2300/0996 ... Calcium-containing inorganic materials, e.g. lime

- C10J 2300/12 . Heating the gasifier
- C10J 2300/1207 .. using pyrolysis gas as fuel
- C10J 2300/1215 .. using synthesis gas as fuel
- C10J 2300/1223 .. by burners
- C10J 2300/123 .. by electromagnetic waves, e.g. microwaves
- C10J 2300/1238 ... by plasma
- C10J 2300/1246 .. by external or indirect heating
- C10J 2300/1253 .. by injecting hot gas
- C10J 2300/1261 .. by pulse burners
- C10J 2300/1269 .. by radiating device, e.g. radiant tubes
- C10J 2300/1276 ... by electricity, e.g. resistor heating
- C10J 2300/1284 .. by renewable energy, e.g. solar energy, photovoltaic cells, wind
- C10J 2300/1292 ... mSolar energy

- C10J 2300/16 . Integration of gasification processes with another plant or parts within the plant
- C10J 2300/1603 .. with gas treatment ([gas cleaning C10K 1/00](#))
- C10J 2300/1606 ... Combustion processes
- C10J 2300/1609 ... Post-reduction, e.g. on a red-white-hot coke or coal bed
- C10J 2300/1612 ... CO₂-separation and sequestration, i.e. long time storage
- C10J 2300/1615 ... Stripping
- C10J 2300/1618 ... Modification of synthesis gas composition, e.g. to meet some criteria
- C10J 2300/1621 ... Compression of synthesis gas
- C10J 2300/1625 .. with solids treatment
- C10J 2300/1628 ... Ash post-treatment
- C10J 2300/1631 Ash recycling
- C10J 2300/1634 Ash vitrification
- C10J 2300/1637 ... Char combustion
- C10J 2300/164 .. with conversion of synthesis gas
- C10J 2300/1643 ... Conversion of synthesis gas to energy
- C10J 2300/1646 integrated with a fuel cell ([gasification of solids in fuel cells H01M 8/0643](#))
- C10J 2300/165 integrated with a gas turbine or gas motor ([gas turbine plants provided with a gas producer F02C 3/28](#); [engines using solid fuels F02B 43/08](#))
- C10J 2300/1653 integrated in an gasification combined cycle (IGCC) ([engines driven by heat coming from a gasification or pyrolysis unit F01K 23/067](#))
- C10J 2300/1656 ... Conversion of synthesis gas to chemicals
- C10J 2300/1659 to liquid hydrocarbons ([Fischer-Tropsch process C10G 2/00](#))
- C10J 2300/1662 to methane (SNG) ([production of synthetic natural gas C10L 3/08](#))
- C10J 2300/1665 to alcohols, e.g. methanol or ethanol ([preparation of alcohols in general C07C 29/00](#))
- C10J 2300/1668 to urea ([preparation of urea C07C 273/00](#)); to ammonia ([preparation of ammonia C01C 1/0405](#))
- C10J 2300/1671 .. with the production of electricity
- C10J 2300/1675 ... making use of a steam turbine

- C10J 2300/1678 .. with air separation ([separating gases using rectification of air F25J 3/04521](#))
- C10J 2300/1681 .. with biological plants, e.g. involving bacteria, algae, fungi
- C10J 2300/1684 .. with electrolysis of water
- C10J 2300/1687 .. with steam generation
- C10J 2300/169 .. with water treatments ([treatment of water in general or water purification C02F](#))
- C10J 2300/1693 .. with storage facilities for intermediate, feed and/or product
- C10J 2300/1696 .. with phase separation, e.g. after condensation

- C10J 2300/18 .. Details of the gasification process, e.g. loops, autothermal operation
- C10J 2300/1807 .. Recycle loops, e.g. gas, solids, heating medium, water
- C10J 2300/1815 ... for carbon dioxide
- C10J 2300/1823 ... for synthesis gas
- C10J 2300/183 .. Non-continuous or semi-continuous processes ([cyclic processes in fixed bed gasification C10J 3/04](#))
- C10J 2300/1838 .. Autothermal gasification by injection of oxygen or steam
- C10J 2300/1846 .. Partial oxidation, i.e. injection of air or oxygen only
- C10J 2300/1853 .. Steam reforming, i.e. injection of steam only
- C10J 2300/1861 .. Heat exchange between at least two process streams
- C10J 2300/1869 ... with one stream being air, oxygen or ozone
- C10J 2300/1876 ... with one stream being combustion gas
- C10J 2300/1884 ... with one stream being synthesis gas
- C10J 2300/1892 ... with one stream being water/steam